

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

**COURSE CURRICULUM
COURSE TITLE: QUANTITY SURVEY AND COSTING
(COURSE CODE: 3356003)**

Diploma Programme in which this course offered	Semester in which offered
Transportation Engineering	5 th Semester

1. RATIONALE

The purpose of cost estimating is to forecast the cost of a project prior to its actual construction. Cost estimating is a method of approximating the probable cost of a project before its construction. At diploma level, students should have the knowledge about to calculate the quantity of materials required for each items of work from the available drawings, preparing detailed specifications, carryout rate analysis. Knowledge and understanding of all these aspects related to estimating and costing are very important for engineers working at site so as to forecast the cost of a project prior to its actual construction.

2. LIST OF COMPETENCY

The course should be taught and implemented with the aim to develop required skills in students so that they are able to acquire following competency:

- **Estimate the cost of civil engineering works related to transportation engineering**

3. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Write detailed specifications for various civil works items as per the code provisions
- Prepare the detailed estimate of stone masonry road and culverts
- Prepare the detailed specification of civil engineering works of transportation engineering.
- Analyse the rates of civil engineering works of transportation engineering.
- Prepare approximate estimate of transportation engineering civil works

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (in hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	4	7	70	30	40	60	200

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; ESE -End Semester Examination; PA - Progressive Assessment

5. COURSE CONTENT DETAILS

Units	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit-I Modes of Measurements	1a. Describe the types of estimate 1b. Justify the data required for estimate 1c. Explain methods of arriving at the quantities for structures 1d. Describe the role of estimator	1.1 Types of Estimate: Construction Cost Estimates, Design Estimates, Bid Estimates, Control Estimates, Objects of Estimating, 1.2 Data required: Taking out Quantities, Methods 1.3 Structures: compound wall, slab, slab culvert, pipe culvert, earthwork for road, W.B.M. road with bitumen carpet, concrete road, R.C.C. retaining wall and roof truss
	1e. Justify the need for types of units 1f. Describe the modes of measurement for different items as per IS:1200	Modes of Measurements: 1.4 Units: types, general rules, mode of measurement of different items, measurement units, accuracy
Unit-II Detailed Estimate	2a. Describe the procedure to prepare estimate for structures 2b. Prepare a detailed estimate of compound wall, slab, slab culvert, pipe culvert, earthwork for road, W.B.M. road with bitumen carpet, concrete road, R.C.C. retaining wall and roof truss	3.1 Structure: Detailed estimate of compound wall, slab, slab culvert, pipe culvert, earthwork for road, W.B.M. road with bitumen carpet, concrete road, R.C.C. retaining wall and roof truss
Unit-III Specifications	3a. Prepare the detailed specification for different types of Stone masonry, earthwork and road work related to transportation engineering	3.1 Detailed specifications for different types of different masonry, Earthwork, road
Unit-IV Rate analyses	4a. Distinguish between R.A., S.O.R., task work 4b. Explain the procedure to conduct rate analyses 4c. Describe the factors affecting R.A. 4d. Derive R.A. for different types of stone masonry road and culverts.	4.1 RA, S.O.R., Task work 4.2 Derive R.A. for different types of stone masonry, road, culverts

Units	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit-V Approximate Estimate	5a. Differentiate Day work, Prime cost, Provisional sum, Provisional Quantities, Spot items, Contingencies charges, Work charged establishment charges 5b. Describe the methods of approximate estimate: Plinth area method, Cubical contents method, Unit base method	5.1 Terminologies related to estimating and work: Day work, Prime cost, Provisional sum, Provisional Quantities, Spot items, Contingencies charges, Work charged establishment charges 5.2 Methods of approximate estimate (Plinth area method, Cubical contents methods Unit base method)

6. SUGGESTED SPECIFICATION TABLE WITH HOURS and MARKS (THEORY)

Units	Units Titles	Teaching Hours	Distribution Of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Modes of Measurements	08	02	06	04	12
II	Detailed Estimate	18	05	10	15	30
III	Specifications	04	02	03	03	08
IV	Rate Analyses	06	02	04	04	10
V	Approximate Estimate	06	00	06	04	10
Total		42	11	29	30	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's Revised Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (*outcomes in psychomotor and affective domain*) so that students are able to acquire the competencies/course outcomes. Following is the list of practical exercises for guidance.

Note: outcomes in psychomotor domain are listed here as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of Course Outcomes related to affective domain. Thus over all development of Programme Outcomes (as given in a common list at the beginning of curriculum document for this programme) would be assured.

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

Unit No.	Practical/Exercise (Outcomes in Psychomotor Domain)	Approx. Hrs. Required
III	Prepare detailed estimate of compound wall	04
III	Prepare detailed estimate of Slab	06
III	Prepare detailed estimate of slab culvert	04
III	Prepare detailed estimate of pipe culvert	04
III	Calculate quantity of earthwork for Road	10
III	Prepare detailed estimate of W.B.M. Road (Bituminous carpet)	04
III	Prepare detailed estimate of concrete Road	02
III	Prepare detailed estimate of R.C.C. retaining wall	04
III	Prepare detailed estimate of any two cases using computer.	04
IV	Prepare detailed Specifications for above useful items	04
V	Perform rate analysis of at least any two items (Use computer Programme or MS Excel)	02
V	Perform rate analysis for at least items of Random, Course, Ashlar Rubble Stone masonry, Earthwork, Road (Bituminous seal/I/II coat, CC/RCC Road), and Culverts construction,(at least ten item)	08
	Total Hours	56

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like: Course/topic based seminars, internet based assignments, teacher guided self learning activities, course/library/internet/lab based mini-projects etc. These could be individual or group- based.

- i Prepare a detailed estimates for above exercises
- ii Prepare a detailed estimate using computer for any two exercises
- iii Prepare/Derive a rate analysis for above items (at least ten item)
- iv Write a detailed specification for above useful items
- v Prepare a rate analysis using computer for any two item

9. SPECIAL INSTRUCTIONAL STRATEGIES (If Any)

- i. Lecture cum demonstration of handy models of different structures
- ii. Ask students to prepare the estimates of the real projects either based on their drawings or based on measurements at site.
- iii. Study of different drawing plan, section (L/s, C/s), Half section elevation

10. SUGGESTED LEARNING RESOURCES

A. List of Books

S. No.	Title of Books	Author	Publication
1	I.S 1200 Part I to XXV (Revised)	B.I.S. Publication	B.I.S. Publication
2	Estimating and Costing in Civil Engg.	Chakraborty, M.C.	Chakraborty, M., Kolkata ISBN 81-85304-36-X
3	Estimating and Costing (Civil Engg.)	Dutta, B.N.	S.Chand and Co., New Delhi

S. No.	Title of Books	Author	Publication
4	Estimating and Costing	Rangwala, S.C.	Charotar Publication, Anand, Gujarat
5	A text book of Estimating and Costing	Birdie, G.S.	Dhanpat Rai, New Delhi
6	Estimating and Costing	Vazirani and Chandola	Khanna Publication, New Delhi
7	Civil Estimating and Costing	Upadhyay, A.K.	S. K. Kataria and Sons, New Delhi

B. List of Major Equipment/Materials with Broad Specifications

Drawing (Plan, Elevation, Section(L/S, C/S, Half Sectional Elevation for different structure, Measurement Sheets, Abstract sheets, Rate analysis Sheet, Models for different structures,

C. List of Software/Learning Websites

- i. www.Autodesk.com
- ii. www.drawingnow.com
- iii. www.learn-to-draw.com
- iv. Pro-E software
- v. http://pmbook.ce.cmu.edu/05_Cost_Estimation.html
- vi. <http://theconstructor.org/constrution/types-of-construction-cost-estimates/841/>
- vii. <http://content.reedconstructiondata.com.s3.amazonaws.com/rsmeans/SamplePages2010/UnitPriceEstimatingSample.pdf>

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. S. M. Shaikh**, Lecturer in Civil Engineering De, Govt. Polytechnic, Kheda
- **Prof. G.R. Rohit**, Lecturer in Civil Engineering, Govt. Polytechnic, Ahmedabad

Coordinator and Faculty Members from NITTTR Bhopal

- **Prof. Subrat Roy**, Professor, Department of Civil and Environmental Engineering
- **Dr. Joshua Earnest**, Professor, Department of Electrical and Electronics Engineering